Malaysian Journal of Social Sciences and Humanities (MJSSH) (e-ISSN : 2504-8562)
2025, Volume 10, Issue 6, e003359
DOI: https://doi.org/10.47405/mjssh.v10i6.3359

REVIEW ARTICLE

Self-Regulated Learning in Blended EFL Contexts: A Systematic Review of Empirical Studies in 2020-2025

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KEYWORDS:
Self-regulated learning
Blended learning
EFL
Higher education
Systematic review

CITATION:
Chen, Y., Marina Mohd Arif, & Gong, C. (2025). Self-Regulated Learning in Blended EFL Contexts: A Systematic Review of Empirical Studies in 2020-2025. *Malaysian Journal of Social Sciences and Humanities (MJSSH), 10*(6), e003359. https://doi.org/10.47405/mjssh.v10i6.3359

ABSTRACT

This systematic review investigates how self-regulated learning (SRL) is conceptualized and studied within blended English as a Foreign Language (EFL) contexts in higher education between 2020 and 2025. Following PRISMA 2020 guidelines, a comprehensive search was conducted in Web of Science and Google Scholar, resulting in 19 empirical studies that met the inclusion criteria. The Mixed Methods Appraisal Tool (MMAT 2018) was used to assess study quality. Data were extracted and thematically analyzed to address three research questions: the theoretical frameworks used, the methodological designs adopted, and the research gaps identified. Results show that while most studies applied SRL theories such as Zimmerman's (2000) cyclical model and Pintrich's (2000) framework, theoretical integration remains fragmented. Quantitative approaches dominate, often relying on self-report questionnaires, though mixed-methods studies are increasing. Key research gaps include a lack of longitudinal and intervention-based studies, insufficient contextual descriptions of blended environments, limited attention to learner diversity, and underexploration of instructor roles. The findings highlight the need for more theory-driven, methodologically rigorous, and context-sensitive research to advance understanding of SRL in digitally mediated language education.

Contribution/Originality: This study contributes to the existing literature by synthesizing recent empirical studies (2020–2025), identifying key theoretical and methodological trends, and highlighting critical research gaps in higher education settings.

1. Introduction

With the advancement of information technology and the evolution of educational paradigms, blended learning (BL) has rapidly gained popularity in global higher

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education, emerging as a widely adopted instructional model. By integrating the strengths of face-to-face (F2F) instruction with online learning, BL offers learners enhanced flexibility and greater engagement opportunities (Graham, 2013). In the context of English as a Foreign Language (EFL) education in particular, blended learning not only optimizes the allocation of instructional resources but also exposes language learners to multimodal input, thereby fostering personalization and increasing learner interaction (Wang, 2022). Studies have demonstrated that EFL learners in BL environments gain more access to authentic language materials, develop stronger autonomous learning capacities, and engage in deeper language practice through diversified learning tasks (Shadiev et al., 2020).

Concurrently, self-regulated learning (SRL) has been widely recognized as a key determinant of language learning outcomes. According to Zimmerman's (2000) cyclical model, SRL involves three core phases: forethought (e.g., goal setting and strategic planning), performance control (e.g., time and environment management, help-seeking), and self-reflection (e.g., self-monitoring and self-evaluation). In the field of foreign language education, learner autonomy has long been considered critical for sustaining motivation and achieving long-term success (Benson, 2001). An increasing number of studies have emphasized that learners in digital and blended learning contexts must possess strong SRL capacities to manage fragmented learning tasks and monitor their own progress effectively (Cho & Heron, 2015; Barnard-Brak et al., 2010).

The COVID-19 pandemic further accelerated the adoption of blended and fully online learning models in higher education worldwide, thus underscoring the importance of learner self-regulation in flexible, technology-mediated environments (Bozkurt & Sharma, 2020). However, SRL does not naturally emerge in BL environments; it must be scaffolded through strategic guidance and technological support. Therefore, understanding how EFL learners apply SRL strategies in blended learning contexts holds both theoretical and practical significance.

Although SRL and BL have each received substantial attention in the educational research literature, empirical studies that explore the intersection of the two—particularly within higher education EFL contexts—remain limited. Existing literature reviews have mainly focused either on theoretical developments of SRL models (Panadero, 2017), learner regulation in online environments (Zheng et al., 2023), or broader trends in SRL within digital learning settings (Yu et al., 2023). In the EFL domain, Yeh and Lin (2023) examined SRL strategy use in online English writing, while Nguyen and Habók (2021) explored cognitive and metacognitive strategies in EFL learning. Although these studies provide valuable theoretical insights, most of them center on Western educational settings and lack in-depth examinations of Asian or Global South contexts (Perry & Rahim, 2021).

Moreover, many prior reviews have not explicitly integrated SRL and BL in their scope. For example, while Kormos and Csizér (2022) reviewed motivational and strategic behaviors in EFL learning, they did not address instructional delivery modes. Hamid et al. (2023) highlighted that existing SRL research often suffers from weak theoretical framing and limited methodological diversity, with a notable lack of mixed-methods studies and longitudinal data. Meanwhile, in blended instructional settings, fostering learners' metacognitive reflection, autonomous planning, and evaluative capacities remains a critical challenge for instructional design (Lim et al., 2021).

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These issues indicate that the relationship between SRL and BL in EFL higher education contexts has yet to be fully conceptualized and empirically synthesized. In particular, while recent years (2020 onward) have witnessed growing research interest in this area due to global educational disruptions, a comprehensive review of empirical findings is still lacking. The present study addresses this gap by systematically reviewing empirical research published between 2020 and 2025 from high-impact databases (e.g., Web of Science) that focuses on the SRL behaviors of EFL learners in blended learning environments.

This review offers several key contributions. First, it systematically summarizes the theoretical frameworks employed in the selected studies, including Zimmerman's (2000) model, Pintrich's (2000) model, and the Winne and Hadwin (1998) model, providing a valuable reference for future research. Second, it synthesizes commonly used instruments, interview protocols, and analysis methods to reveal methodological patterns and limitations in the current body of empirical literature. Third, the review highlights structural gaps in geographic representation, strategy dimensions, and methodological approaches, and calls for more inclusive, culturally sensitive, and theoretically grounded studies—particularly those situated in Asian or non-English-dominant contexts.

Guided by these aims, this review addresses the following research questions:

i. What theoretical foundations underpin empirical research on SRL in blended EFL contexts?
ii. What research designs, instruments, and data analysis methods have been used in these studies?
iii. What research gaps can be identified in the current empirical literature?

Through addressing these questions, this review seeks to offer EFL instructors, curriculum designers, and researchers a comprehensive understanding of how SRL is examined and applied in blended learning contexts. It also provides practical insights for integrating SRL strategies into blended instructional design and proposes directions for more robust, inclusive, and theory-driven future research. Given the ongoing transformation of global higher education, this review is both timely and necessary.

2. Method

This section presents the methodological procedures followed in conducting the systematic review. Specifically, it outlines the search strategy and selection criteria, the inclusion and exclusion standards, the study selection process, and the methods used for data extraction and synthesis. The review was conducted in accordance with the PRISMA 2020 guidelines to ensure transparency, reproducibility, and methodological rigor.

2.1. Search Strategy and Selection Criteria

This systematic review strictly followed the PRISMA 2020 (Preferred Reporting Items for Systematic Reviews and Meta-Analyses) guidelines to ensure the transparency, rigor, and reproducibility of the review process (Page et al., 2021). PRISMA is widely used to guide systematic reviews, especially in educational and applied linguistic fields involving diverse methodologies.

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The primary database selected for literature retrieval was Web of Science (WoS), due to its rigorous indexing standards and comprehensive coverage of high-impact, peer-reviewed journals in education and applied linguistics. To address potential gaps and improve the comprehensiveness of the search, Google Scholar was used as a supplementary source, particularly focusing on top-ranked empirical studies.

The search strategy aimed to locate empirical studies published between 2020 and 2025, focusing on the application and impact of self-regulated learning (SRL) strategies among English as a Foreign Language (EFL) learners in blended learning (BL) environments at the higher education level. Keywords were combined using Boolean logic, as follows: ("self-regulated learning" OR "SRL") AND ("blended learning" OR "hybrid learning") AND ("EFL" OR "English language learners") AND ("university students" OR "college students" OR "higher education")

In the initial stage, no discipline-specific filters were applied to maximize coverage. Thematic relevance was further refined during the screening process.

2.2. Inclusion and Exclusion Criteria

To ensure the scientific and contextual appropriateness of included studies, clear inclusion and exclusion criteria were applied at both the abstract and full-text screening stages. The specific criteria are summarized in Table 1.

Table 1: Inclusion and Exclusion Criteria

Inclusion Criteria	Exclusion Criteria
Empirical research with analyzable data	Non-empirical or theoretical papers
EFL learners at the higher education level	Non-EFL learners or non-higher education settings
Focus on both SRL and BL	Studies not involving both SRL and BL
Published between 2020 and 2025	Published before 2020
English publications	Non-English publications

2.3. Literature Selection Process

The literature search was conducted in March 2025. The Web of Science Core Collection was queried using the above search terms, limiting the document type to 'article' and selecting only SSCI-indexed journals. Additionally, the 'enriched cited references' option was enabled. This resulted in 605 records. A supplementary search using Google Scholar, limited to the top 150 ranked results, identified another 150 potentially relevant studies. In total, 755 records were gathered.

All records were imported into Zotero for management and de-duplication. After removing 65 duplicates, 690 unique articles remained for title and abstract screening. At this stage, 605 articles were excluded for not meeting the criteria (e.g., lacking empirical design, irrelevant context or population). The remaining 85 articles proceeded to full-text review.

During full-text screening, 66 studies were excluded due to the following reasons: (1) participants were not in higher education, (2) SRL or BL was not a central focus, or (3) the study context was not related to EFL learning. Ultimately, 19 high-quality empirical studies were retained for data extraction and analysis. The PRISMA 2020 flow diagram

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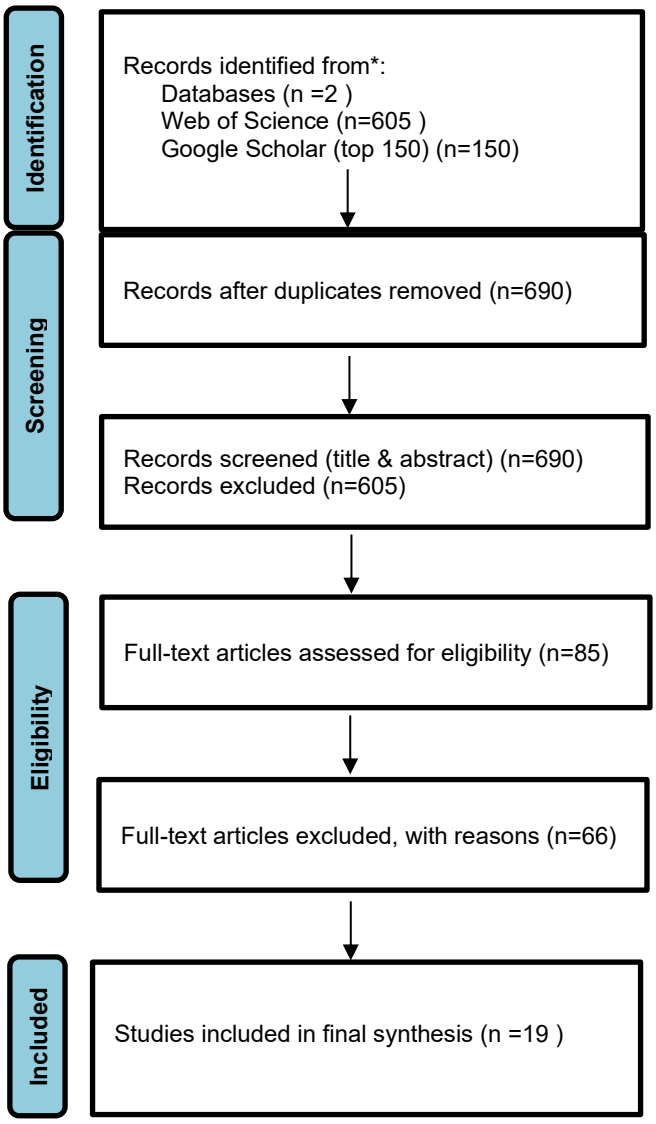
Figure 1 illustrates the full selection process. Each included study is labeled R1 to R19; see Table 2 for full references.

Figure 1: PRISMA Flowchart of Study Selection Process



Source: Adapted from Page et al. (2021)

Table 2: Reference Coding of Included Studies

No.	Author(s) and Year
R1	Erdel (2023)
R2	Elkot & Ali (2020)
R3	Zhang, Liu & Wilson (2024)
R4	Tang, Li & Wang (2024)
R5	Omari & Arssi (2024)
R6	Öztürk & Çakıroğlu (2021)
R7	Hosseini et al. (2020)
R8	Peng (2021)
R9	An, Gan & Wang (2020)
R10	Mudra (2025)
R11	Wang (2022)
R12	Wardani et al. (2023)

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R13	Apridayani et al. (2023)
R14	Kaptanoğlu & Kavanoz (2024)
R15	Alghofaili (2022)
R16	Ganieva et al. (2020)
R17	Wahyuningsih & Afandi (2023)
R18	Hosseini (2020)
R19	Yeh & Lin (2023)

In addition, to ensure the quality of the studies included in this review, the Mixed Methods Appraisal Tool (MMAT) 2020 version was employed to assess 19 articles, covering multiple dimensions of quantitative, qualitative, and mixed-methods research designs. The assessment focused on the rationality of the study design, the transparency of data collection and analysis, the validity of research instruments, and the credibility of the conclusions. The results of the assessment indicated that all included studies met the criteria for medium or higher quality and were eligible for data extraction and synthesis. For detailed assessment results, please refer to Table 3.

Table 3: Quality Assessment Summary Using MMAT (2020)

MMAT Dimension	Assessment Summary
Study Design Appropriateness	All included studies met minimum design standards (quantitative, qualitative, or mixed).
Transparency in Data Collection and Analysis	Majority provided sufficient detail on tools, sampling, and analysis.
Validity of Measurement Tools	Most studies used validated instruments or piloted tools.
Clarity and Justification of Conclusions	Findings were consistent with data; conclusions were well supported.

2.4. Data Extraction and Analysis

To systematically extract key information from the selected studies, a standardized data extraction sheet was developed. Table 4 outlines the key variables coded.

The data extraction was independently completed by two reviewers. Any discrepancies were resolved through discussion and full-text cross-checking. All extracted data were recorded and organized using Microsoft Excel to ensure traceability and consistency in subsequent analysis.

Table 4: Data Extraction Variables

Variable Category	Details
Basic Study Information	Author(s), year, country/region
Participant Characteristics	Sample size, gender, academic level
Research Design Type	Quantitative, qualitative, or mixed methods
Study Focus	SRL dimensions, BL model
Theoretical Frameworks	E.g., Zimmerman's (2000) model, Pintrich's (2000) model, Winne and Hadwin (1998) model
Data Collection Tools	Questionnaires, interviews, log data, etc.
Analysis Methods	Descriptive, regression, thematic coding, etc.
Key Findings	Main outcomes related to SRL in BL environments

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3. Results and Discussion

This section presents the main findings of the review, structured around the three research questions. It begins with an analysis of the theoretical frameworks adopted in the selected studies, followed by a synthesis of their research designs, data collection tools, and analysis methods. Finally, it identifies key research gaps and limitations in the current body of empirical literature on SRL in blended EFL learning contexts.

3.1. Theoretical Frameworks Adopted

The 19 empirical studies included in this systematic review demonstrate a diverse use of theoretical frameworks. Most researchers relied on theoretical models to guide their research design and interpret findings, thereby enhancing the scientific rigor and explanatory power of their work. However, considerable variation was observed in the frequency, types, and depth of application of theoretical frameworks across studies. Table 5 provides a summary of the theoretical frameworks used across the studies.

Table 5: Theoretical Frameworks Adopted in the Reviewed Studies

No.	Author(s) and Year	Theoretical Framework	Remarks
R1	Erdel (2023)	Zimmerman's (2000) SRL model	Used Self-Regulated Online Learning Scale
R2	Elkot & Ali (2020)	SRL in mobile learning	Focused on technology-enhanced SRL strategies
R3	Zhang, Liu & Wilson (2024)	Zimmerman (2002)	Validated COSLQ; mixed methods
R4	Tang, Li & Wang (2024)	SRL Motivation Theory	Explored motivational dimensions in SRL
R5	Omari & Arssi (2024)	Zimmerman's (2000) model	SRL in EFL reading
R6	Öztürk & Çakıroğlu (2021)	SRL in flipped classrooms	Experimental design focused on SRL-based flipping
R7	Hosseini et al. (2020)	SRL in microlearning	Technology-mediated learning strategy integration
R8	Peng (2021)	Zimmerman's (2000) model	Focused on goal setting and environment structuring
R9	An, Gan & Wang (2020)	Technology-supported SRL model	Developed and validated TSELSS
R10	Mudra (2025)	General SRL framework	Emphasis on metacognition and time strategies
R11	Wang (2022)	Zimmerman's (2000) model	SRL as predictor of BLE satisfaction

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R12	Wardani et al. (2023)	MSLQ constructs	Focused on grammar learning achievement
R13	Apridayani et al. (2023)	SRL strategies + anxiety	No explicit theory; explored SRL-anxiety connection
R14	Kaptanoğlu & Kavanoz (2024)	Online SRL & self-efficacy	Adapted Online SRL Questionnaire
R15	Alghofaili (2022)	SRL as self-motivation moderator	Emphasized BL's effect on SRL and motivation
R16	Ganieva et al. (2020)	MSLQ strategies	Focused on online SRL dimensions
R17	Wahyuningsih & Afandi (2023)	No explicit model	Narrative inquiry; implicit SRL principles
R18	Hosseini (2020)	SRL & autonomy	Microlearning as a scaffold for SRL
R19	Yeh & Lin (2023)	SRL in writing	Examined reflective writing and regulation strategies

3.1.1. Overall Use of Theoretical Frameworks

Among the 19 studies, 13 explicitly adopted a theoretical framework, accounting for 68.4% of the total. These studies typically drew upon established learning theories to construct variable systems, design research instruments, and explain results related to EFL learners' self-regulated learning (SRL) behaviors and outcomes in blended learning environments. In contrast, the remaining six studies did not specify a clear theoretical basis, relying instead on empirical observation as a starting point. This divergence reveals a polarization in the field: on one hand, a group of theoretically grounded studies follows a rigorous, model-driven approach; on the other hand, a notable number of studies exhibit a lack of theoretical anchoring, which may limit their depth and generalizability.

3.1.2. Use of SRL-Related Theoretical Frameworks

Among those studies that did apply theoretical frameworks, SRL-related models were the most frequently used. Notably, Zimmerman's (2000) Cyclical Model of Self-Regulated Learning was referenced in seven studies, making it the most widely adopted. This model conceptualizes SRL as a three-phase process: the forethought phase, the performance phase, and the self-reflection phase. Researchers used this model to analyze how learners in blended learning contexts set goals, develop strategies, manage time and emotions, and engage in post-task reflection and self-evaluation. Several studies noted that Zimmerman's (2000) model is particularly effective in explaining learner behavior in autonomous, technology-mediated contexts, highlighting its relevance in online learning components of blended environments.

In addition, Pintrich's (2000) General Framework for SRL was applied in several studies (e.g., R7, R9, R14). This model emphasizes the interaction between motivational beliefs, cognitive strategy use, metacognitive control, and behavioral regulation. Compared to

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Zimmerman's (2000) model, Pintrich's (2000) framework places greater emphasis on the dynamic balance between motivation and strategy, making it particularly suitable for interpreting how EFL learners adapt their behaviors in response to changes in task difficulty or external support.

3.1.3. Use of Blended Learning-Related Frameworks

Regarding the blended learning dimension, the Blended Learning Framework proposed by Graham (2013) was frequently adopted to conceptualize learning environment variables and interpret the integration mechanisms of online and face-to-face instruction. This framework emphasizes three key dimensions: the digitalization of content, the degree of instructional integration, and the evolving role of learners across settings. Several studies (e.g., R3, R11, R17) used this model to analyze how blended learning design affects learners' motivation, autonomy, and engagement. Their findings suggest that well-designed BL models can enhance SRL by offering learners greater flexibility and responsibility in managing their learning experiences.

It is also worth noting that some studies (e.g., R6, R13) adopted Garrison et al.'s (2000) Community of Inquiry (CoI) framework, focusing on the interaction among teaching presence, social presence, and cognitive presence. These studies used a sociocultural lens to explore how learners engage cognitively and socially within blended platforms. The CoI framework enabled researchers to examine how the quality of interaction in blended environments fosters the use of SRL strategies, underscoring the mediating role of social and instructional contexts in shaping learner self-regulation.

3.1.4. Emerging Trends in Integrated Theoretical Frameworks

Three studies (R5, R12, R19) attempted to integrate multiple theoretical frameworks to construct composite models. For example, R5 combined Zimmerman's (2000) cyclical SRL model with Graham's (2013) BL framework to examine how different types of blended designs mediate the relationship between SRL strategies and learning outcomes. Similarly, R12 integrated the CoI framework with Pintrich's (2000) model to investigate the path relationships between social interaction and SRL strategy use. These integrative approaches reflect a growing tendency among researchers to transcend the limitations of single frameworks and embrace multidimensional models that better capture the complexity of learning in blended contexts.

However, while such integrated frameworks offer richer explanatory power, they also pose challenges. For instance, R19 struggled to delineate clear conceptual boundaries when referencing multiple theories simultaneously, resulting in overlapping constructs in its questionnaire items and potentially undermining the validity and reliability of the measurement. This highlights the need for future research to maintain conceptual clarity and instrument precision when employing multi-theory designs.

3.1.5. Lack of Theoretical Foundations and Its Implications

Despite the overall trend toward theory-driven research, six studies did not explicitly identify any theoretical framework. These studies typically began with empirical observation, seeking to explore the relationship between SRL behavior and learning outcomes through data analysis alone. While these studies may offer practical insights, the absence of a guiding theory limits their explanatory scope and hinders

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generalizability. The lack of theoretical structure is particularly problematic when defining variables and constructing causal paths, leading to potential inconsistencies or arbitrary design choices.

Moreover, some studies nominally referenced theoretical models but failed to apply them meaningfully throughout the research. For instance, although some studies cited Zimmerman's (2000) model in the introduction or literature review, they did not use it to inform instrument design or guide interpretation of results. This phenomenon of "superficial theory adoption" suggests that meaningful application of theory must go beyond citation—it requires systematic integration into the research process, from operationalization to discussion.

3.1.6. Summary

In summary, while there is a clear trend toward theory-informed research in the study of SRL among EFL learners in blended learning environments, considerable variation remains in the adoption, selection, and application depth of theoretical frameworks. Zimmerman's (2000) cyclical SRL model and Graham's (2013) blended learning framework are the most frequently used, while the use of integrated frameworks is on the rise, signaling a move toward more holistic and cross-disciplinary models. However, instances of theoretical absence or superficial application still exist, pointing to the need for deeper alignment between theory and empirical inquiry to enhance both the scientific rigor and explanatory value of future research.

3.2. Research Design, Data Collection, and Analysis Methods

This section analyzes the methodological characteristics of the 19 included studies, with a focus on research design types, data collection procedures, and data analysis methods. A systematic examination of these dimensions reveals prevailing methodological trends and practices in SRL research within blended EFL learning environments, offering valuable reference points for future inquiry. Table 6 summarizes the research design types, tools used for data collection, and analysis methods.

Table 6: Research Design and Data Collection Methods

No.	Author(s) and Year	Research Design	Data Collection Tools	Analysis Methods
R1	Erdel (2023)	Quantitative	SROLS survey	Descriptive, correlation
R2	Elkot & Ali (2020)	Mixed methods	Survey, interviews	Descriptive + thematic
R3	Zhang, Liu & Wilson (2024)	Mixed methods	COSLQ, interviews	Regression + coding
R4	Tang, Li & Wang (2024)	Quantitative	Motivation-SRL scale	Regression
R5	Omari & Arssi (2024)	Quantitative	SRL reading strategies questionnaire	ANOVA, t-tests
R6	Öztürk & Çakıroğlu (2021)	Quantitative	SRL pre-post survey	Experimental design
R7	Hosseini et al. (2020)	Quantitative	Microlearning + SRL scale	Descriptive statistics
R8	Peng (2021)	Qualitative	Journals, logs	Narrative analysis

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R9	An, Gan & Wang (2020)	Quantitative	TSELSS scale	CFA, regression
R10	Mudra (2025)	Qualitative	Reflection reports	Thematic analysis
R11	Wang (2022)	Quantitative	BLE scale, SRL scale	SEM
R12	Wardani et al. (2023)	Quantitative	MSLQ	Correlation
R13	Apridayani et al. (2023)	Mixed methods	Survey, interviews	Content + descriptive
R14	Kaptanoğlu & Kavanoz (2024)	Quantitative	OSRLQ	t-tests, correlation
R15	Alghofaili (2022)	Quantitative	SRL scale	Regression
R16	Ganieva et al. (2020)	Quantitative	Online-adapted MSLQ	ANOVA, descriptive
R17	Wahyuningsih & Afandi (2023)	Qualitative	Interviews	Narrative inquiry
R18	Hosseini (2020)	Qualitative	Microlearning logs	Thematic analysis
R19	Yeh & Lin (2023)	Mixed methods	Surveys + writing portfolios	Content analysis

3.2.1. Research Design Types

In terms of research design, quantitative methods remain predominant. Out of the 19 studies, 12 (63.2%) employed quantitative designs, six (31.6%) used mixed-methods approaches, and only one (5.2%) utilized a purely qualitative design. This distribution indicates a strong reliance on quantitative data collection and analysis within the field, especially in studies investigating the frequency of SRL strategy use or its correlation with learning outcomes. The popularity of quantitative methods is largely attributable to their scalability and capacity for statistical inference.

The increasing use of mixed-methods reflects growing methodological maturity in the field. These studies seek to bridge the gap between the "what" explored by quantitative studies and the "why" illuminated by qualitative approaches. For example, R5, R9, and R12 combined survey results with semi-structured interviews or learning journal analyses to explore learners' subjective experiences and challenges when employing SRL strategies, thereby enhancing both explanatory depth and external validity.

The only qualitative study (R17) adopted interviews and classroom observations to investigate learners' perceptions of autonomy and strategy use in blended learning environments. Although limited in sample size, this study provided rich insights into the relationship between learners' internal psychological processes and their regulatory behaviors.

3.2.2. Data Collection Methods

Questionnaires were the most commonly used data collection tool, appearing in 15 of the reviewed studies. These instruments gathered information on variables such as SRL

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strategies, blended learning experiences, learner motivation, and academic achievement. Most questionnaires were adapted from well-established instruments like Zimmerman's (2000) Self-Regulated Learning Interview Schedule or Pintrich's (2000) Motivated Strategies for Learning Questionnaire (MSLQ). In some cases, authors developed new tools tailored to their specific research goals. While questionnaires offer operational convenience and are suitable for large-scale data collection, they are also subject to self-report bias, which underscores the need for validity and reliability checks.

In addition to questionnaires, several studies utilized learning analytics from online learning platforms. For example, R6 and R13 analyzed behavioral data such as login frequency, time on task, and activity completion, recorded automatically by learning management systems (LMS). These objective indicators were compared with self-report data to enhance the credibility of the findings and minimize bias.

Semi-structured interviews were employed in seven studies, primarily within mixed-method and qualitative designs. These interviews aimed to uncover learners' perceptions, challenges, and preferences regarding SRL in blended settings. Thematic coding of interview data helped identify commonly used strategies and behavioral patterns, contributing to theory refinement and model development.

Furthermore, reflective writing tasks, such as learning journals and logs, were used in studies like R12 and R17. These self-reported texts offered a first-person account of learners' SRL behaviors, providing insights into cognitive, emotional, and motivational dimensions. Despite their subjectivity, such data sources offered unique access to the processes underlying learners' strategic choices and adaptations.

3.2.3. Data Analysis Methods

In quantitative studies, descriptive and inferential statistical techniques were widely used. Frequency distributions, means, and standard deviations were employed to illustrate the extent and variability of SRL strategy use. Correlational analysis, regression models, and structural equation modeling (SEM) were applied to examine the relationships among SRL dimensions, learner characteristics, and academic outcomes.

For instance, R4 and R10 used Pearson's correlation to reveal positive relationships between SRL strategy use and learning satisfaction or English achievement. R2 and R7 applied multiple regression to test the predictive power of specific SRL dimensions, identifying time management and self-evaluation as significant predictors of learning success.

Structural equation modeling (SEM), a more advanced technique, was employed in R3 and R5 to explore the mediating and moderating effects among SRL strategies, motivation, blended learning satisfaction, and outcomes. These studies demonstrated rigorous theoretical modeling and allowed researchers to assess both direct and indirect effects among latent variables.

In qualitative analysis, thematic analysis was the predominant method. Studies such as R12 and R17 systematically coded qualitative data to identify patterns in learners' SRL practices, strategy selection criteria, and perceived barriers. Some researchers used qualitative software like NVivo to enhance the transparency and reliability of their coding procedures.

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Despite these strengths, several methodological challenges were noted: (1) limited sample sizes reducing generalizability; (2) lack of detailed reporting on the development or validation of measurement instruments; and (3) insufficient documentation of coding procedures or triangulation strategies in qualitative studies. These limitations point to the need for enhanced methodological rigor in future SRL research in blended contexts.

3.2.4. Summary

In summary, the studies included in this review show the following methodological characteristics: First, quantitative methods remain dominant, though mixed-methods research is gaining traction and offering more comprehensive insights. Second, questionnaire-based surveys are the most common data source, but platform-generated analytics, interviews, and journals are increasingly being used to diversify and enrich the dataset. Third, analysis methods range from basic descriptive statistics to complex SEM models, with thematic analysis used extensively in qualitative work.

The growing diversity and complexity in methodological approaches place higher demands on research design. Future studies should improve representativeness, ensure instrument validity and reliability, and enhance transparency in data processing. Moreover, cross-method integration and cross-cultural comparative designs are encouraged to deepen our understanding of EFL learners' SRL mechanisms in blended learning environments.

3.3. Identified Research Gaps

Through an in-depth analysis of the 19 empirical studies included in this review, six major categories of research gaps were identified. These gaps relate to theoretical development, contextual clarity, learner diversity, methodological design, instructional roles, and data integration. They collectively reflect structural limitations in the existing body of literature on self-regulated learning (SRL) in blended English as a Foreign Language (EFL) learning environments. Table 7 presents a summary of the key gaps found in the literature.

Table 7: Research Gaps in the Reviewed Studies

Research Gap Category	Specific Limitation	Example Studies
Theoretical underdevelopment	No framework or unclear model	Wahyuningsih & Afandi (2023), Apridayani et al.(2023)
Self-report bias	No triangulation with logs/interviews	Wardani et al.(2023), Alghofaili (2022)
Weak methodological diversity	No experimental or longitudinal research	Omari & Arssi(2024), Mudra (2025)
Learner diversity ignored	No attention to gender/major/residence	Peng (2021), Tang et al. (2024)
Instructor role overlooked	No investigation into SRL facilitation in BL	Yeh & Lin (2023), Zhang et al. (2024)

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3.3.1. Lack of Theoretical Depth and Coherence

Although most studies adopted theoretical frameworks, the overall depth and coherence of theory use remain insufficient. Some studies either lacked a clear theoretical model (e.g., R8, R16) or cited SRL-related theories only in passing without applying them consistently throughout the research process. This phenomenon of "fragmented theory adoption" weakens the internal logic of the studies and undermines their explanatory power. In particular, few studies established dynamic theoretical pathways linking SRL behaviors to motivational, cognitive, and contextual variables across different stages of blended learning.

Moreover, some studies that attempted to integrate multiple theories (e.g., R19) faced challenges in delineating key constructs. Overlapping definitions and concept redundancy in survey items led to problems with measurement validity. Future research should aim to balance theoretical integration with conceptual clarity and empirical operability.

3.3.2. Inadequate Description of Blended Learning Environments

A second common gap lies in the insufficient contextualization of blended learning designs. Many studies failed to provide detailed descriptions of the instructional structure, technology platforms, content delivery formats, or teacher roles in the blended environments they investigated. This lack of contextual transparency makes it difficult to evaluate the generalizability of findings or to replicate the studies.

Some studies referenced blended learning only as a background condition, without analyzing how its specific features influenced SRL strategy adoption (e.g., R4, R14). Given that SRL is highly sensitive to instructional context, future research should systematically document key design elements of the blended environment, such as interaction formats, feedback mechanisms, and autonomy-supporting tools.

3.3.3, Insufficient Attention to Learner Diversity

Many studies overlooked the role of individual learner differences in shaping SRL behavior in blended contexts. Variables such as gender, academic discipline, learning style, digital literacy, and place of residence (on-campus vs. off-campus) were rarely examined as potential moderators or mediators (e.g., R2, R11). The absence of such analyses limits our understanding of how different subgroups navigate the demands of blended learning.

Only a few studies (e.g., R5, R9) explored the effects of learner diversity, suggesting that students with higher self-efficacy, better time management, or more prior experience with online learning tend to perform better in blended environments. Future studies should conduct more fine-grained analyses to explore how demographic, psychological, and contextual factors interact with SRL strategies.

3.3.4. Overreliance on Cross-Sectional Designs

A significant methodological gap is the dominance of cross-sectional designs and the scarcity of longitudinal or intervention-based studies. Most studies relied on one-time surveys (e.g., R1, R7), which can only provide a static snapshot of SRL behaviors. These

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designs are limited in their ability to capture dynamic changes in learner strategies over time or in response to specific instructional interventions.

Longitudinal and experimental studies (e.g., R3, R6) were rare but highly valuable. They revealed that learners' SRL capacities can evolve during the course of a semester and that targeted interventions can foster greater autonomy and strategic awareness. Expanding the use of such designs would allow researchers to explore the developmental trajectory of SRL and its responsiveness to pedagogical change.

3.3.5. Limited Use of Mixed Methods and Data Integration

While a growing number of studies adopted mixed-methods approaches (e.g., R5, R12), many lacked effective data integration strategies. Qualitative and quantitative findings were often reported in parallel without triangulation or theoretical synthesis. In some cases, the qualitative component served only a supplementary or illustrative role, reducing the analytical potential of the combined design.

There is a need for more robust mixed-methods research that systematically integrates data sources, validates self-report measures through behavioral data, and links learner narratives to quantitative outcomes. Such integration would strengthen internal validity and provide a more holistic understanding of SRL in blended EFL learning.

3.3.6. Underrepresentation of Instructor Roles and Instructional Design

Most studies focused solely on learners' behaviors, attitudes, and outcomes, neglecting the role of instructors in facilitating SRL. Very few studies examined how teacher feedback, scaffolding, or interactional strategies supported learners' self-regulation (e.g., R13, R17). This omission reflects a broader tendency to treat SRL as an individual cognitive trait rather than a socially mediated process.

Given the centrality of instructor presence in blended learning—both online and face-to-face—future research should incorporate teacher perspectives and explore how instructional design features influence the development of SRL capacities. Variables such as task design, feedback timing, and platform structure should be explicitly analyzed to uncover their regulatory effects.

3.3.7. Summary

In conclusion, although recent studies have provided valuable insights into SRL in blended EFL contexts, several structural limitations persist. These include insufficient theoretical grounding, vague descriptions of blended learning contexts, limited attention to learner diversity, overreliance on cross-sectional designs, inadequate data integration in mixed-methods research, and the underrepresentation of instructor roles. Addressing these gaps will require more theoretically integrated, context-sensitive, and methodologically rigorous studies, with a stronger focus on interactional and pedagogical dimensions of SRL development.

4. Conclusion

Against the backdrop of accelerating digital transformation in education and evolving instructional paradigms, blended learning (BL) has emerged as a widely adopted

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modality in higher education. At the same time, self-regulated learning (SRL)—recognized as a critical determinant of learner autonomy, persistence, and achievement—has gained increasing attention from educational researchers. This systematic review analyzed 19 empirical studies published between 2020 and 2025 that focused on EFL learners' SRL behaviors in blended higher education contexts. The aim was to synthesize the theoretical frameworks, research designs and methods, and identified gaps, thereby offering meaningful implications for both future research and instructional practice.

At the theoretical level, the majority of the reviewed studies were grounded in SRL models developed by scholars such as Zimmerman (2000), Pintrich (2000), Winne and Hadwin (1998). These models provided robust conceptual tools for categorizing learner strategies and constructing causal pathways. Additionally, several studies adopted frameworks from the blended learning domain—most notably, Graham's (2013) Blended Learning Framework and Garrison et al.'s (2000) Community of Inquiry (CoI) model—which expanded the scope of interpretation by integrating environmental and social dimensions. However, despite the relatively widespread use of theory, issues such as fragmented application, logical incoherence, and insufficient dynamic modeling were observed, indicating that deeper integration and refinement of theoretical frameworks remains a pressing need in the field.

From a methodological standpoint, quantitative approaches continue to dominate the literature, with most studies employing cross-sectional survey designs to measure the frequency of SRL strategy use and its correlations with academic performance, motivation, or satisfaction. The growing number of mixed-methods studies reflects researchers' increasing interest in combining behavioral data with subjective accounts. Though fewer in number, qualitative studies made important contributions by offering rich, in-depth insights into the psychological mechanisms and contextual influences on SRL strategy use. In general, the methodological landscape is becoming more diversified; however, challenges such as limited sample representativeness, a lack of longitudinal data, and weak data triangulation persist.

Based on a thorough analysis of the included studies, this review identified six key research gaps:

i. insufficient depth and coherence in theoretical construction;
ii. underdeveloped contextual descriptions of blended learning environments;
iii. lack of attention to learner diversity (e.g., gender, discipline, cultural background);
iv. overreliance on cross-sectional designs and underuse of longitudinal or intervention studies;
v. limited integration in mixed-methods research; and
vi. neglect of the role of instructors and instructional design in SRL development.

These gaps not only constrain the generalizability of existing findings but also suggest that current research has not yet captured the full complexity of SRL in blended EFL learning contexts.

In light of these findings, the following recommendations are proposed for future research: First, greater efforts should be made to construct integrative theoretical models, particularly those capable of explaining complex variable relationships and the multi-phase nature of SRL. Second, researchers should provide detailed accounts of instructional design and platform usage when reporting blended learning contexts, in

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order to improve contextual transparency and practical relevance. Third, greater emphasis should be placed on analyzing learner subgroups, exploring how individual characteristics interact with SRL strategies. Fourth, longitudinal and experimental designs should be promoted to track learners' strategic development over time and assess the impact of targeted interventions. Fifth, mixed-methods research should be enhanced through systematic triangulation and integrated analysis, increasing the credibility and richness of findings. Finally, future studies should incorporate instructor-related variables, examining how teacher feedback, guidance, and scaffolding influence SRL strategy use in blended learning environments.

In sum, this review has not only synthesized current research on SRL in blended EFL learning but also identified critical structural gaps and promising directions for future development. For educational researchers, it offers a theoretical and methodological roadmap; for practitioners, it underscores the value of embedding SRL strategies into course design; and for policy-makers, it highlights SRL as a key variable in enhancing the quality of higher education. As digital technologies and pedagogical approaches continue to evolve, fostering effective self-regulation in blended learning environments will remain a central challenge—and opportunity—for the field of EFL education.

Ethics Approval and Consent to Participate

Not applicable

Acknowledgment

The authors would like to express their sincere gratitude to Universiti Teknologi MARA (UiTM) and the Faculty of Education for providing the necessary facilities and academic support throughout the research process. This publication was made possible with the support of the Journal Support Fund, UiTM.

Funding

The Journal Support Fund, UiTM

Conflict of Interest

The authors declare there are no conflicts of interest.

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